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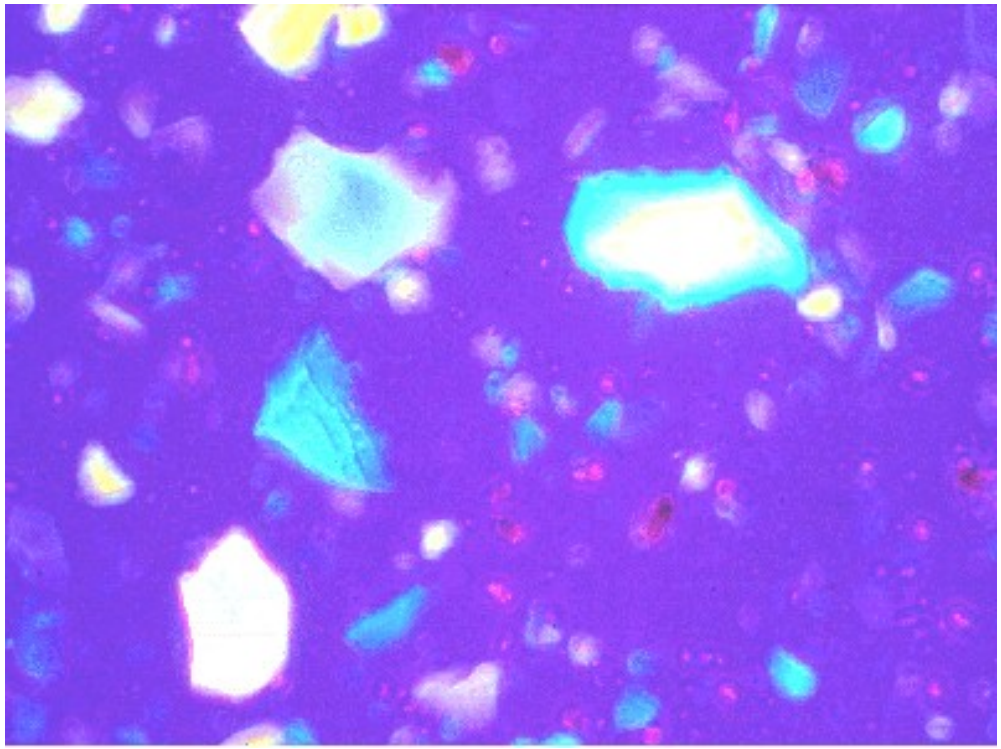
Safety Awareness for responders to Emergency Operations: Silica Awareness



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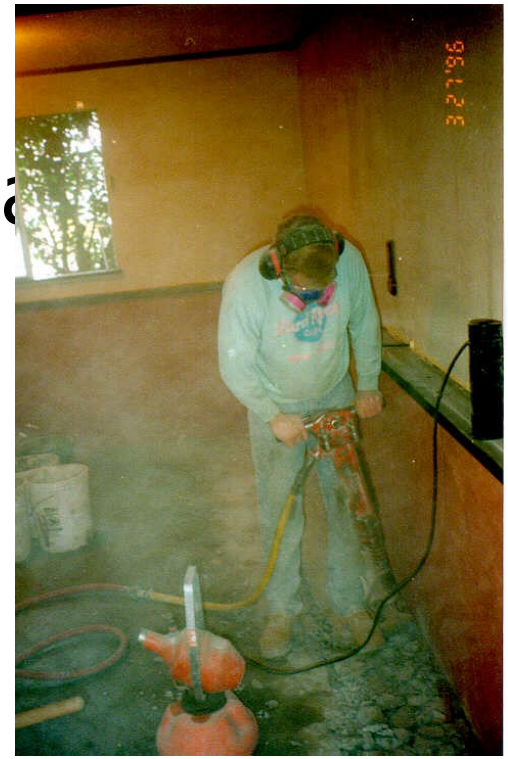
Overview

- Introduction to Silica
- Health Hazards for Silica
- Protection from Silica



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Objectives of this training - At the end of this short session, you should be able to:

1. Identify the hazards
2. Explain how to protect yourself from these hazards
3. Increase safety and health awareness

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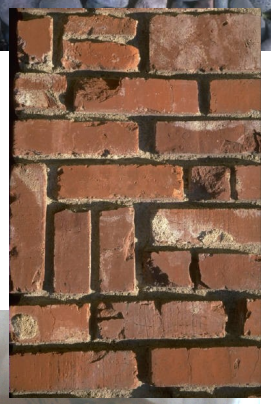
What is Silica?

Silica is Quartz

Quartz (silica) is found naturally in almost all rock, sand and soil.

It is also found in concrete products and bricks.



It is sometimes found in sandblasting (abrasive blasting) grit and is called “silica sand”.

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Silicosis Program Importance

- 1996 OSHA Special Emphasis Program
- Elimination of hundreds of silicosis cases each year
- Total US deaths, 1968-1990, where silicosis reported on death certificate: 13,744
- Silicosis as cause of death: 6,322
- 10% of silica related deaths are in construction

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WHY Target Crystalline Silica Exposure?

- Widespread occurrence & use
  - Maritime
  - Agriculture
  - Construction
  - General Industry
- Number of related deaths
- Number of exposed workers
- Health effects

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Occurrence of Crystalline Silica

- SiO_2 is basic component of sand, quartz, & granite rock
- Quartz is 2nd most common mineral in earth's crust
- Airborne silica is produced by, among other activities,

Katrina Demolition Activities

Sandblasting	*Stonecutting*
Rock drilling	*Drilling*
Roof bolting	*Quarrying*
Foundry work	*Tunneling*

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Predict Which Operation Would Generate the Highest Dust Exposures

- Drilling
- Grinding
- Sweeping
- Sawing
- Chipping/Jackhammer
- Abrasive Blasting
- Shoveling

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Typical Industries with Silica Exposure

- Electronics
- Foundries
- Ceramics, clay & pottery, stone, & glass
- Construction
- Agriculture
- Maritime
- Mining
- Railroad (setting & laying track)
- Slate & flint quarrying & flint crushing
- Use & manufacture of abrasives
- Manufacture of soaps & detergents

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Hazard: Breathing dust containing silica

- Protect yourself from breathing dust, wear NIOSH-approved respirators.
- **If in doubt about respirators, see your supervisor.**
- An N-95 or greater respirator is acceptable for most activities, including silica and portland cement dust.
- If asbestos is present, use a half-mask elastomeric respirator with N,R, or P-100 series filters.
- If airborne contaminants are causing eye irritation, full-face respirators with P-100 organic vapor/acid gas (OV/AG) combination cartridges should be used.
- Make sure you are fit-tested for a respirator and do a positive and negative seal check every time you were your respirator. Wash it at least once a day.
- Surgical masks should **not** be used because they do not provide adequate protection.
- Replace filters when breathing becomes difficult or you detect an odor through organic cartridges.

N-95 Respirator

½ face respirator with P-100/OV/AG cartridges

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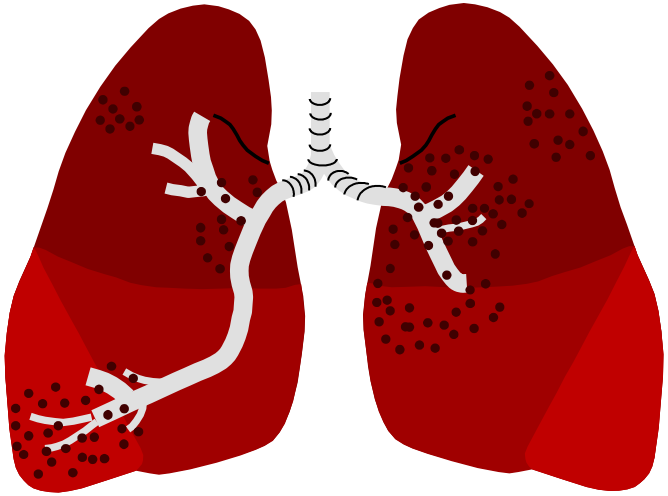
Health Effects

- Pulmonary fibrosis (silicosis)
- Possible lung cancer



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Health Effects

- Acute - intense crystalline silica exposure
  - acute silicosis (silico-proteinosis)
  - inflammation in the gas exchange area of the lung
  - fibrosis

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Health Effects

- Accelerated - more intense exposure over 5 to 15 years
  - silicosis
  - smaller fibrotic nodules
  - massive fibrosis in the mid-zones of the lungs
  - shortness of breath
  - fever
  - bluish skin at ear lobes or lips

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Health Effects

- Chronic - 20 to 45 years prolonged exposure to crystalline silica
  - silicosis
  - nodular lesions in upper lobes
  - shortness of breath with exertion
  - cough and expectoration
  - fatigue
  - loss of appetite
  - chest pain (airway obstruction)

** x-ray (after 15-20 years) **

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Silica Exposure Limits

Is there a safe limit for silica?

The safest amount of silica in the air is zero.

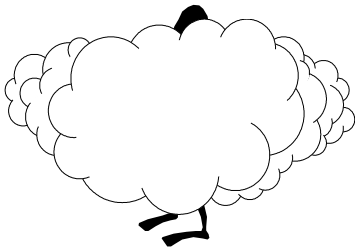
This is the legal limit set by WISHA.

In the air – 100 micrograms per cubic meter

The legal limit is called a "permissible exposure limit" or "PEL".

This limit is for respirable (fine) dust.

Rule-of-thumb: if dust containing silica is visible in the air, it's almost certainly over the permissible limit.



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Silica Health Hazards

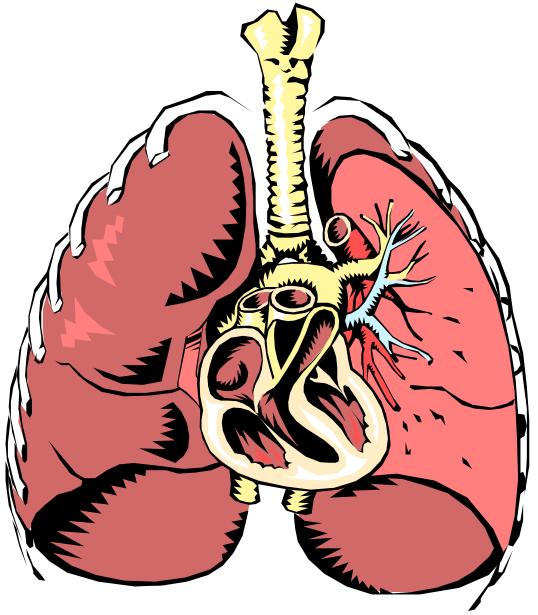
Inhaled silica dust scars the lungs

A lung disease called “silicosis” is caused by breathing of dust containing silica.

The dust causes “fibrosis” or scar tissue formation in the lungs.

This reduces the lung’s ability to extract oxygen from the air.

There is no cure.



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Silica Health Hazards

What are the symptoms of silicosis?

Early stages go unnoticed.

Continued exposure results in shortness of breath during exercise.

Prolonged high exposure can lead to extreme shortness of breath, chest pain, respiratory failure and death.

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Silica Health Hazards

Other Health Effects

- Susceptibility to other lung diseases and infections such as tuberculosis.

- Acute silicosis may develop after very short periods of high exposure.

- Chronic silicosis develops after many years of lower levels of exposure.

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Protection from Silica Exposure

- Wet the area to prevent airborne dust particles
- Wear a NIOSH approved respirator
  - N95
  - Half or Full-Face APR with HEPA Filters